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(I) Functional and Functionalized Membranes

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Cell membranes are complex dynamic structures, and their composition and structure are major determinants of pathology. It is now commonly accepted that the membranes' physical properties, such as fluidity and thickness, are determining factors for permeability, partitioning of drug molecules, and protein aggregation. Membrane-interacting molecules can in some instances be expected to have a greater therapeutic potential than traditional therapies targeting receptors or enzymes. I will provide a perspective on the basic mechanisms how physical membrane properties can affect diseases, and the therapeutic potential of changing membrane properties to target certain diseases. We developed red blood cell based hybrid liposomes for targeted drug delivery with antiviral and antibiotic properties that show great therapeutic potential because of their biocompatibility. We also use these ideas and techniques in our start-up (www.synth-med.com) that develops smart membrane-based sensors for the detection of pathogens in water and food.

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